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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/025,749	12/18/2001	Khandker N. Quader	M-12220 US	1671
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24251 7590 03/07/2003

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EXAMINER

NGUYEN, NAM THANH

ART UNIT	PAPER NUMBER
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2824

DATE MAILED: 03/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/025,749

Applicant(s)

QUADER ET AL.

Examiner

Nam T Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-30 and 39-43 is/are allowed.
- 6) ☒ Claim(s) 31-38, 44 and 45 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

DETAILED ACTION

Information Disclosure Statement

1. This office acknowledges receipt of the following items from the Applicant:
Information Disclosure Statement (IDS), filed on December 18, 2001.
Information disclosed and list on PTO 1449 was considered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 31-38 and 44-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al (U.S. Pat. No 6,522,580).

Regarding claims 31, 44 and 45, Chen discloses the memory cells comprising a first set of one or more memory cells (the set that stores data as shown in " Pages 0,2" in figure 11) selected to store a charge (each state "00", "01", "10", "11" has a particular threshold voltage V_{Tr} .ie. particular charge level) equal to or greater than a first predetermined charge level corresponding to a first set of data bits; a second set of one

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or more memory cells (the set that stores data as shown in "Pages 1,3" in figure 11) selected to store a charge equal to or greater than a second predetermined charge level corresponding to a second set of data bits, wherein the memory device is configured to simultaneously program the first and second sets of memory cells (Pages 0,2 and Pages 1,3 are simultaneously programmed, see column 11, lines 25-30) and inhibit programming of any memory cell (see column 18 lines 39-40, it is further noted that when bit line BL I connected to Vdd, then the inhibit programming operation is performed) that reaches or exceeds the first determined charge level (level 61, figure 13) until all memory cells in the first set have reached or exceeded the first predetermined charge level.

Regarding claims 32 and 34, the circuit of Chen et al clearly configured to continue programming until all memory cells in the second set (Pages 1, 3 in figure 11) have reached the first predetermined level (level 61 in figure 13) and or the second predetermined level (level 62 in figure 13).

Regarding claims 33 and 35, the voltage that applies to the memory cells in the first set (Pages 0,2 in figure 11) or in the second set (Pages 1,3 in figure 11) through the word lines which connected to these memory cells in the verify mode (namely 2.4V, see column 8, lines 30-35) would be a first test voltage and a second test voltage.

Regarding claims 36 -38, figure 2 of Chen et al clearly shows that their memory device comprises a plurality of floating gate transistor (M) arranged in a plurality of columns and rows

Allowable Subject Matter

4. Claims 1-30 and 39-43 are allowed.

Prior art, alone or in combination, fail to teach or suggest a method of programming a plurality of non-volatile memory cells in parallel from a common threshold level into at least first and second threshold levels as designated by data being stored in the memory cells, the method comprising applying programming conditions to all of the plurality of memory cells designated for the first and second threshold levels; terminating application of the programming conditions to individual ones of the plurality of memory cells designated for the first and second threshold levels as the cells designated for the first and second threshold levels individually reach the first threshold level; after those of the memory cells designated for the first threshold level have all reached the first threshold level, applying programming conditions to those of the plurality of memory cells designated for the second threshold level; and terminating application of the programming conditions to individual ones of the plurality of memory cells designated for the second threshold level as the cells designated for the second threshold level individually reach the second threshold level.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chen (U.S. Pat. No. 6,456,528) discloses a selective operation of a multi-state non-volatile memory system in a binary mode.

Chevallier (U.S. Pat. No. 6,278,632) discloses a method and circuitry for performing analog over-program and under-program detection for a multi-state memory cell.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nam T Nguyen whose telephone number is (703) 305-6494. The examiner can normally be reached on 8 am to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (703) 308-2816. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

N. Nguyen
February 27, 2003


MICHAEL S. LEBENTRITT
PRIMARY EXAMINER